

Marine Shoreline Health as an Integrating Concept for Policy, Education and Public Involvement in Puget Sound

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We can describe Puget Sound by its physical characteristics: over 16,500 square miles of drainage basin where over 10,000 rivers, streams and creeks drain into the Sound; an average depth of over 460 feet and at its deepest over 900 feet; and having over 2,000 miles of shoreline.

We can also describe Puget Sound by the plants and animals that call it home: about 3,000 invertebrate creatures, over 220 fishes, over 300 types of algae and seagrasses, about 116 marine birds, and 29 kinds of resident or transitory marine mammals.

And there are about 7 million Washington and British Columbia residents who call the Puget Sound/Georgia Basin region home.

But Puget Sound remains an abstraction because all those descriptions fail to capture the dynamism of Puget Sound's tides and currents, the intermingling of its fresh and salt waters, its web of living organisms, the cultures and behaviors of its human presence, and the varied forms its intersections of water and land take.

Since the first Puget Sound Water Quality Management Plan was adopted nearly 20 years ago, planners and educators have endeavored to describe the ecosystem functions of Puget Sound in a way people can understand. The premise is that protecting Puget Sound depends on an understanding and appreciation of the Sound's ecosystem functions—the physical environment, the flora and fauna, and their interactions.

Planners, policy makers, educators and activists have used concepts such as “watershed” and “estuary” as ways with which to grasp the dynamic relations in the Puget Sound ecosystem. Both are useful models within limitations. The watershed concept of drainage basin captures the dynamic nature of the riparian ecosystem. The estuary concept captures the dynamic nature of where the salt and fresh water ecosystems meet. In both cases, however, the dynamic relationships of where the marine and terrestrial environments meet—the shoreline—are missed.

Yet we know that Puget Sound is defined by more than 2,000 miles of marine shorelines where nearly all of Washington's 4.5 million Puget Sound inhabitants live within 20 miles of the land's edge. Shoreline habitats of sandy beaches, rocky shore, eelgrass beds and kelp forests, salt marshes, and intertidal mudflats form the basis of the food web that supports the region's sea and shorebirds, herring and smelt, shellfish and salmon, and the marine mammals and human enterprise that depend on them.

We have come to understand the relationship of eelgrass beds, herring, salmon, and orcas. We know that insects from terrestrial vegetation, in many cases, provide up to half of the food for growing salmon. We know that sand lance and surf smelt feed salmon and seabirds, but need sandy beaches to reproduce. And we're still trying to better understand the intricate predator and prey relationships in shallow bays and sheltered inlets.

It is time to focus on shoreline values and the attributes of a healthy marine shoreline. These attributes are 1) clean water and sediment free of fecal and chemical contamination; 2) natural processes of erosion and accretion; 3) natural accumulations of woody debris; 4) aquatic and terrestrial vegetation; and 5) species diversity.

Industrialization, urbanization, and a lack of knowledge about the long-term effects of toxic contaminants has resulted in the accumulation of toxic chemicals in the sediment of the urban bays and inlets of the Sound. Many of these contaminants, such as mercury and PCBs bioaccumulate up the food chain and in the fatty tissue of salmon and orcas.

Over the last 100 years, however, an ever-expanding population has resulted in the loss of more than one-third of nearshore habitats to bulkheads, piers, docks and other structures. We have destroyed 75 percent of our salt marsh habitat, and shoreline habitat has been degraded by polluted runoff and by wave action from the loss of protective

marshes. This loss has led to closed shellfish beds, Endangered Species listings for salmon, the disappearance of forage fish and eelgrass meadows, and the ever-increasing potential for ecosystem and food web collapse.

The survival of the Puget Sound ecosystem requires formulating and carrying out a long-term strategy, in partnership with other NGOs and with government agencies and Tribes, that integrates best scientific knowledge, precautionary policies and regulations, and robust public education and involvement regarding protection and restoration of shoreline habitats and resources.

The attempt to integrate available and best scientific knowledge in the last couple of years has led to development of several methodologies to assess shoreline habitat and resource information. In this way, priorities have been established for site protection and restoration in a rational, rather than opportunistic, manner. On a watershed level, a key challenge is to set priorities for action that can be coordinated and properly phased, so that downstream cleanups are done after upstream restoration and pollution prevention is in place.

One such tool developed by People For Puget Sound is the Bays Blueprint method that uses available data to systematically identify targets for nearshore habitat conservation and restoration in a specific geographic area. The Blueprint method has been used in the northern bays of Skagit County to assess and to integrate available data on habitats, processes and resources. It analyzes in a Geographic Information System format shoreline photos, maps, and data from studies and inventories from sources such as ShoreZone, Washington Department of Fish and Wildlife, Department of Ecology drift cell and slope stability mappings, and local planning and development offices. In the Blueprint process, shoreline locations were typed, catalogued, and mapped as potential sites for protection and restoration based on habitat and resource criteria that included marine birds, forage fish, salmon rearing areas, vegetation, and feeder bluffs. These potential sites were subsequently assessed by local residents using social and economic feasibility criteria. Using this methodology, the Blueprint can be used to justify the potential for restoration or conservation actions at specific high feasibility sites to landowners, potential funding sources, resource managers, elected officials, and other groups. Future applications of this methodology can be expanded to include clean water and sediment data.

Regulations, education, land acquisition, or a combination of specific tactics can be developed to accomplish conservation goals for a specific site; likewise specific restoration plans can be developed for specific sites. The use of a site-based method within the context of a larger ecosystem's processes and resources is consistent with an ecosystem approach of protecting habitats and suites of species rather than individual species and specific habitat features. This site-based approach is a key element in local planning for critical area ordinances and shoreline master programs.

The protection of critical spawning, rearing or feeding habitats for species as varied as salmon, forage fish, marine birds and crustaceans can be accomplished by weaving together the web of existing authorities regulating harvest, hydraulics, marine protected areas and aquatic reserve management, and Clean Water Act and Endangered Species Act requirements. These existing authorities can be used to protect restored sites.

Very little of this restoration or protection will be accomplished without public understanding and appreciation of the value of the shoreline environment. That understanding and appreciation cannot be based on an abstract appreciation, but has to be personal and experiential. This appreciation has to begin with a clear sense of the places along the shores of Puget Sound that you-- as a property owner, a beachwalker, a fisher or shellfish harvester, diver or boater-- know. The appreciation of the Puget Sound ecosystem grows from learning about the habitat, processes and species in that place and then learning about how we fit within the larger ecosystem of Puget Sound.

We call this appreciation the "literacy" of knowing one's place in the Puget Sound ecosystem and understanding how our actions affect the ecosystem. Protection or restoration of clean water, natural processes, woody debris, or the diversity of flora and fauna along the shoreline will not happen until we know why those things make a shoreline, and the Sound, healthy. Once we do understand, there will be an out flowing of actions large and small of individual and group stewardship, a "citizenship," on behalf of the Sound.

People For Puget Sound in 2004 dedicated itself in leading, focusing and working with the public's efforts to protect and restore 2000 miles of Puget Sound's shorelines over the next 10 years. That will require a methodology like the Bays Blueprint to guide where we are going and to measure what we have accomplished. It will require leadership

from our elected officials, using all available policy tools in the terrestrial, intertidal and marine environments to protect what we have and what we restore. It will require a significant increase in funding, both public and private, devoted to saving the Sound, and willing property owners to acquire critical areas and to restore critical areas back to health. It will require a literate and involved citizenry to help generate the political will and political leadership to protect and restore the Sound.

Protecting and restoring 2000 miles of Puget Sound shoreline in 10 years will be the collective work of Tribes, government agencies and many groups, not just People For Puget Sound. The progress of this effort be measured using a Geographic Information System (GIS)-based mapping methodology similar to the Blueprint project. Segments of the nearshore will be scored to reflect physical habitat improvements using indicators such as water quality, sediment quality, overwater vegetation coverage and intertidal vegetation, and shoreline softening. A companion score for each segment of the shoreline will be based on preservation and policy elements such as education programs, local ordinances, conservation purchases and easements, and state regulation improvements.

The poet William Blake wrote of seeing the universe in a grain of sand. Here, we will succeed when we see Puget Sound in every place along its shoreline.